

IN THE CLAIMS

Complete listing of the claims:

1. (Currently amended) A method of forming an insulating film in a semiconductor device, the method comprising:
sequentially repeating a plurality of times:
 forming ~~an a~~ partial insulating film ~~in a semiconductor device~~, wherein the partial insulating film has a thickness in the range of 0.3 to 2 nm; and
 removing impurities from the partial insulating film, wherein the removing impurities is performed at a temperature greater than 500°C; ~~to form an insulating film having a prescribed thickness~~
 wherein the removing impurities comprises removing residual carbon.
2. (Currently amended) The method ~~for forming the insulating film in a semiconductor device~~ of claim 1, wherein the removing impurities is performed in a reducing gas atmosphere or an oxidizing gas atmosphere.
3. (Currently amended) The method of claim 1, wherein the removing impurities ~~a plurality of times comprises:~~
 removing impurities in a first treatment in a reducing gas atmosphere; and
 removing impurities in a second treatment in an oxidizing gas atmosphere.
4. (Previously presented) The method of claim 2, wherein the reducing gas atmosphere comprises an ammonia gas, a hydrogen gas and an inert gas, a combination comprising at least one of the foregoing gases, or plasma nitrogen, or the reducing gas atmosphere is formed in a vacuum.
5. (Previously presented) The method of claim 2, wherein the oxidizing gas atmosphere comprises an oxygen gas, a nitrogen monoxide gas, a nitrous oxide gas, an ozone gas, or a combination comprising at least one of the foregoing gases, or plasma oxygen.

6. (Previously presented) The method of claim 3, wherein the reducing gas atmosphere comprises an ammonia gas, a hydrogen gas, an inert gas, or a combination comprising at least one of the foregoing gases, or plasma nitrogen, or the reducing gas atmosphere is formed in a vacuum.

7. (Previously presented) The method of claim 3, wherein the oxidizing gas comprises an oxygen gas, a nitrogen monoxide gas, a nitrous oxide gas, an ozone gas, or a combination comprising at least one of the foregoing gases, or plasma oxygen.

8. (Currently amended) ~~A method~~The method of claim 1, comprising:

~~forming an insulating film in a semiconductor device, wherein the partial~~
insulating film has a thickness in the range of 0.5 to 2 nm;~~and~~
~~removing impurities from the insulating film to form an insulating film having a~~
~~prescribed thickness.~~

9. (Currently amended) A method of forming an insulating film in a semiconductor device, the method comprising:

sequentially repeating a plurality of times:

~~forming an a partial insulating film in a semiconductor device, wherein the~~
~~partial insulating film has a thickness in the range of 0.3 to 2 nm; and~~

~~removing impurities from the partial insulating film to form an insulating~~
~~film having a prescribed thickness;~~

~~wherein the removing impurities a plurality of times comprises:~~

~~removing impurities in a first treatment in a reducing gas~~
~~atmosphere; and~~

~~removing impurities in a second treatment in an oxidizing gas~~
~~atmosphere; and~~

the removing impurities comprises removing residual carbon.

10-12 (Cancelled)

13. (New) The method of claim 1, wherein the removing impurities comprises desorbing CO₂.
14. (New) The method of claim 1, wherein the removing impurities comprises desorbing CO₂, CH₄, C₂H₆, or a combination comprising at least one of the foregoing gases.
15. (New) The method of claim 1, wherein the forming the partial insulating film comprises depositing an Al precursor, an Hf precursor, or a combination comprising at least one of the foregoing precursors.
16. (New) The method of claim 1, wherein the precursor is trimethyl aluminum, tetrakis(dimethylamino)hafnium, or a combination comprising at least one of the foregoing precursors.
17. (New) The method of claim 12, wherein water vapor is used as an oxidant for the precursor in the forming the partial insulating film.
18. (New) The method of claim 9, wherein the oxidizing gas comprises an oxygen gas, a nitrogen monoxide gas, a nitrous oxide gas, an ozone gas, or a combination comprising at least one of the foregoing gases, or plasma oxygen.
19. (New) The method claim 9, wherein sequentially repeating a plurality of times comprises sequentially repeating three times.
20. (New) The method claim 16, wherein sequentially repeating a plurality of times comprises sequentially repeating eight times.
21. (New) A method of forming an insulating film in a semiconductor device, the method comprising:
sequentially repeating a plurality of times:

forming a partial insulating film by atomic layer deposition employing an Al precursor, an Hf precursor, or a combination comprising at least one of the foregoing precursors, while employing water vapor gas as oxidant, wherein the partial insulating film has a thickness in the range of 0.3 to 2 nm; and
removing impurities from the partial insulating film,
wherein the removing impurities comprises:
removing impurities in a first treatment in a reducing gas atmosphere; and
removing impurities in a second treatment in an oxidizing gas atmosphere, and
wherein the removing impurities comprises removing residual carbon.